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REVIEWS.

THE ORIGIN OF GENERA.*—In this essay the author does not consider that generic and specific characters are identical. He divides animals into numerous series, specific, generic and so on, in which the lower members of each form the progressive steps, with the exception of course of the specific series. "The lowest or most generalized terms or genera of a number of allied series, will stand to each other in a relation of exact parallelism. That is, if we trace each series of a number, up to its lowest or most generalized genus, the latter together will form a series similar in kind to each of the sub-series, *i. e.*, each genus will be identical with the undeveloped conditions of that which progresses the farthest, in respect, of course, to the characters which define it as a series." Cases of exact parallelism are accounted for by the law of "retardation and acceleration," which is claimed to be "a continual crowding backwards of the successive steps of individual development, so that the period of reproduction" "falls later and later in the life history of the species, conferring upon its offspring features in advance of those possessed by its predecessors."

Prof. Cope here points out a parallel between the development of the individual and of the genus of great interest and novelty. "As one or more periods in the life of every species is characterized by a greater rapidity of development (or metamorphosis) than the remainder, so in proportion to the approximation of such a period and the epoch of maturity or reproduction, is the offspring liable to variation. During the periods corresponding to those between the rapid metamorphosis, the characters of the genus would be preserved unaltered, though the period of change would be ever approaching." "As the development of the individual, so the development of the genus. We may add so the development of the whole of organized beings."

After stating that as a rule animals exhibit in course of development certain specific, before they do generic, characters, the author says: "Apart from any question of origin, so soon as a species should assume a new generic character, it ceases, of course, to be specifically the same as other individuals which have not assumed it. If supposed distinctness of origin be, however, a test of specific difference, we shall then have to contend with the paradox of the same species belonging to two different genera at one and the same time." Several instances then are brought forward to prove the proposition "that the nearest species of adjacent genera are more nearly allied in specific characters than the most diverse species of the same genus," and, also, that like varieties of distinct species are much nearer in shape and appearance than unlike varieties of the same essential species." In course of time a series is formed in which the adult characteristics of the original genus are reduced to a larval condition, but the original genus still continues to "accelerate" its own development, though more slowly, and finally reduces its original characteristics also to a larval condition, and acquires in the adult state different characteristics from the first series.

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*The Origin of Genera. By Prof. E. D. Cope. Philadelphia. 8vo, pp. 80. $1.25.

This, with other confirmatory evidence, renders it probable that generic changes may simultaneously take place in a number of species without the loss of their specific characteristics, and in the same way genera may be simultaneously transferred from one suborder to another without the loss of their generic characteristics. The development of generic characteristics thus appears to be governed by a law which is not dependent upon physical surroundings. Species on the other hand, though they "exhibit a proportion of characters which are the successive stages of that one which progresses farthest," yet "the majority of specific characters are of divergent origin, — are "morphic as distinguished from developmental.* Thus specific characteristics are essentially adaptive, and therefore due mainly to natural selection. The author's conclusions are given in six propositions, from which we quote the two given below:

I. Species have developed from preëxistent species by an inherent tendency to variation, and have been preserved in given directions and repressed in others, by the operation of the law of Natural Selection.

II. Genera have been produced by a system of retardation or acceleration in the development of individuals; the former on preëstablished, the latter on preconceived lines of direction. Or in other words, while nature's series have been projected in accordance with the law of acceleration and retardation, they have been limited, modified and terminated by the law of natural selection, which may itself have operated in part by the same law.

AN ILLUSTRATED WORK ON THE BUTTERFLIES OF NEW ENGLAND. — Mr. Samuel H. Scudder will publish during the coming winter, a large and expensively illustrated work upon New England Butterflies. He will give, as far as possible, a complete history and description of each species during every stage of its existence; tables and descriptions of genera will be introduced, together with a preliminary chapter upon the general structure of butterflies, which will serve as a guide to their careful study; their geographical distribution, both in and out of New England, will be largely discussed, and the book virtually form a manual for all the Northern United States; it will be generously illustrated by colored plates of every species, done in the highest style of the art.

To make the work as complete as possible, the author invites the assistance of entomologists in obtaining living or fresh specimens of eggs, larvæ and pupæ, for illustration and study. Without such assistance it would be impossible, in a single summer, to obtain all the requisite material. Full credit will be given in the book for every item of assistance rendered.

The success with which Mr. Saunders, of Canada, has reared butterflies in their earlier stages, ought to encourage our friends to similar